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PATENT SPECIFICATION

DRAWINGS ATTACHED

853,905

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COMPLETE SPECIFICATION

A Slider for Sliding Clasp Fasteners

I, HARRY HANSEN, of 14, Høffdingsvej, Valby, Copenhagen, Denmark, a subject of the King of Denmark, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a slider for sliding clasp fasteners, of the type comprising a spring biased latch member pivotably mounted at the outer side of the outer wing of the slider and having a finger extending through an opening in the said outer wing to engage the rows of coupling links for the purpose of providing an automatic arresting device, the said latch member being formed with an inclined cam surface located at the outer side of the outer wing and adapted for engagement by the pulling link of the slider.

In sliders of this type, when the slider is left to itself, the latch member will be urged towards the rows of coupling links under the influence of the spring force, which may originate from a separate spring or from the latch member itself if the latter is constructed and arranged as a spring blade, so as to have its finger engaged in the rows of coupling links, thereby arresting the slider relative to the latter. When gripping the pulling link of the slider and exerting a pulling force in the rearward direction, i.e. in the opening direction of the fastener, the pulling link will engage the said cam surface to force the finger of the latch member out of engagement with the rows of coupling links so that the slider is released and can be pulled in the desired direction. As soon as the pulling force of the pulling link ceases, the finger of the latch member is again engaged with the rows of coupling links so that the slider is arrested in the position to which it has been moved.

As a rule, the finger of the latch member is constructed in such a manner that during movement of the slider in the opposite direction, i.e. in the closing direction, it is capable of sliding yieldably along the rows of coupling links without the necessity of applying an external lifting force to the latch member. However, it is desirable that the latch member should be constructed in such a manner that it will also be lifted by the pulling link when the slider is moved in the closing direction.

Particular attention will now be given to the conditions prevailing during movement of the slider in the opening direction.

As above mentioned, the lifting of the latch member is caused by the engagement of the pulling link, in most cases a transverse pin forming part thereof, with the cam surface of the latch member. The lifting force to which the latch member is thereby subjected will be proportional to the pulling force exerted on the pulling link and will also depend on the inclination of the cam surface, viz. in such a manner that the lifting force will be the greater the smaller the inclination of the cam surface. In other words the ratio of the lifting force to the pulling force exerted on the pulling link will be determined by the inclination of the cam surface and will be the greater the smaller this inclination. This again means that, when the lifting force is to have a certain value in order to overcome the spring force, the pulling force to be exerted on the pulling link to release it will be the greater the greater the inclination of the cam surface. Now, in order to obtain satisfactory operation of the slider, it must be possible to keep the latch member constantly out of engagement with the rows of coupling links while it is being pulled at a constant speed in the opening direction. In this condition the pulling force on the pulling link will be equal to the frictional resistance between the slider and the rows of coupling links. Consequently, the slider must ride the more tightly on the rows of coupling links the steeper the cam surface. Since, it is desirable that the slider should not ride too tightly on the rows of coupling links, but should run as smoothly along the latter as

[*Price 3s. 6d.*]

Price 25p

possible, and since also a slider is not likely to remain riding tightly on the rows of coupling links, though it may do so at the start, it will be advantageous to keep the inclination of the cam surface relatively small. Moreover, it will be advantageous to keep the spring force on the latch member as small as possible, because this spring force too is a factor in determining the required frictional resistance between the slider and the rows of coupling links, as will be apparent from the above analysis.

It is desirable in many instances that the point of engagement between the latch member and the rows of coupling links should not be located too far towards the rear end of the slider.

Finally, it is desirable that the lifting force exerted on the latch member to disengage the latter from the rows of coupling links should be transferred to the engaging portion of the latch member at a favourable ratio.

It is an object of the invention to devise a slider that fulfils the above requirements.

With this object in view, according to the invention, in a slider for sliding clasp fasteners of the type specified, the said latch member is constructed with a tongue located outwardly of the said finger and separated therefrom by a slot open at its rearward end, the outer edge of the said slot forming the said cam surface for engagement by the pulling link of the slider and extending longitudinally over a distance such as to permit relative movement of the engaging portion of the pulling link to positions both forward and rearward of the engaging end of the said finger.

The invention will now be described by way of example with reference to the accompanying drawings, in which,

Fig. 1 shows a longitudinal section through one form of a slider according to the invention, and

Fig. 2 shows a plan view of the same upon removal of the front cap and spring.

In the drawing, 1 is the outer wing, and 2 the inner wing of the slider. These are interconnected by means of a more or less diamond shaped neck portion 3 located at the front end of the slider, i.e. the end of the slider which in the partly opened condition of the sliding clasp fastener is directed towards the opened or disengaged portion of same. The outer and inner wings and the neck portion are shaped in conventional manner so as to form channels between themselves to guide the rows of coupling links of the fastener into and out of engagement with one another upon movement of the slider in one and the other direction respectively.

On its outer side, the outer wing 1 is constructed with a rear projection 4 and a front projection 5. These are constructed at their ends facing one another with slits 6 and 7, respectively, serving to receive a flat latch member 8. As shown in Fig. 1, the slits 6 and 7 and the latch member 8 are disposed in the plane of the paper. References to upper and lower in the specification are meant to refer to directions in Fig. 1. The latch member 8 is kept in position by the guiding surfaces formed by the side walls of the slits, but apart from this guiding the latch member is freely movable in its own plane within certain limits. The slit 7 is extended into the bdy of the outer wing 1 to form a recess 9 which accommodates a heel portion 10 of the latch member 8. The heel portion 10 is rounded at its front end as indicated at 11. At its top the latch member 8 is terminated with a nose 12 at its front end.

The rearward portion of the latch member is bifurcated by means of a slot 13 to form two branches, viz: a lower, or inner, branch in the form of a finger 14 extending through an opening 15 of the outer wing 1 and having a downwardly turned end 16 serving to engage the rows of coupling links, and an upper or outer, branch in the form of a tongue 17, the lower edge of which is shaped to form an inclined cam 18 for engagement by a transverse pin 19 forming part of the pulling link 20 of the slider. A complementary cam surface 28 may be formed on the upper side of the outer wing 1 if desired.

The upper edge of the latch member 8 is engaged by a spring blade 21 which is received in a front cap 22 attached to the projections 4 and 5 so as to cover the latter and the latch member extending therebetween. The spring 21 engages the front cap 22 adjacent its ends, and in a zone intermediate its ends engages the upper edges of the latch member 8. Between this zone of engagement and the nose 12 the upper edge of the latch member 8 is constructed with a concave edge portion 23. The nose 12 engages the spring 28 to close to the end thereof that when the latch member is subjected to forces in a direction towards this point of engagement, the spring will act as a rigid support of the nose 12. If desired, the arrangement may be such that, in the case described, the end portion of the spring may be pressed into engagement with the underside of the front cap 22, thereby forming an absolutely rigid support.

As will be seen, the cam surface formed by the lower edge of the tongue 17 or in other words by the upper, i.e. outer edge of the slot 13, extends longitudinally of the slider over a distance such as to permit the transverse pin 19 to move to positions both forward and rearward of the engaging end 16 of the finger 14. Consequently, the active length of the cam surface, i.e. the length of the same along which it can be engaged by the pulling link, can be made relatively long which again means that it can be constructed with a relatively small angle of inclination relative to the direction of travel of the slider. Only a relatively small

pulling force will therefore be required on the pulling link in order to disengage the latch member from the rows of coupling links, and this again means that the slider can be constructed to run relatively smoothly on the rows of coupling links without adversely affecting the locking function. Also of importance in reducing the required pulling force on the pulling link is the circumstance that the spring 21 can be constructed with a relatively small spring force. The reason for this is that when unintentional opening forces occur, the latch member will be urged upwards and forwards so that the nose 12 is pressed into firm contact with the supporting surface formed by the end of the spring 21 and the front cap 22 thereby forming a knife edge support constituting the fulcrum of the latch member in this situation. Since a line 24 through this point and the engaging end 16 of the finger 14 is steep relatively to the direction of travel of the slider, or in the other words to the longitudinal direction of the rows of coupling links, the engaging end 16 will have a pronounced tendency to move downwards when the latch member rotates about the knife edge support formed by the nose 12, whereby the latch member will bite more firmly into the rows of coupling links. The arrangement may be such that the angle between the line 24 and the direction of travel of the slider is so great that the latch member becomes self-locking, i.e. will not be disengaged from the rows of coupling links by unintentional opening forces, but on the contrary will bite into the latter more and more firmly, even if the latch member were not influenced by any spring force at all. The spring 21 may therefore be very weak, because its function is not to keep the latch member in engagement with the rows of coupling links, but only to establish this engagement from the beginning. As pointed out above a low value of the spring force is advantageous in contributing towards minimizing the required pulling force on the pulling link.

It is also to be observed that since the transverse pin 19 of the pulling link is capable of moving past the engaging end of the finger, the lifting force will be transferred to the latter at a very favourable transmission ratio which, in contrast to known slide fasteners, may exceed 1.

When the slider is moved in the closing direction, the transverse pin 19 of the pulling link 20 will engage the bottom of the slot 13 and will thereby normally keep the finger 14, 16 out of engagement with the rows of coupling links, while the closing movement is taking place.

WHAT I CLAIM IS:—

1. A slider for sliding clasp fasteners, of the type comprising a spring-biased latch member pivotably mounted at the outer side of the outer wing of the slider and having a finger extending through an opening in the said outer wing to engage the rows of coupling links for the purpose of providing an automatic arresting device, the said latch member being formed with an inclined cam surface located at the outer side of the outer wing and adapted for engagement by the pulling link of the slider, characterised in that the said latch member is constructed with a tongue located outwardly of the said finger and separated therefrom by a slot open at its rearward end, the outer edge of the said slot forming the said cam surface for engagement by the pulling link of the slider and extending longitudinally over a distance such as to permit relative movement of the engaging portion of the pulling link to positions both forward and rearward of the engaging end of the said finger.

2. A slider for a sliding clasp fastener, substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

REDDIE & GROSE,
6, Bream's Buildings, London, E.C.4,
Agents for the Applicants.

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853,905 COMPLETE SPECIFICATION
1 SHEET
This drawing is a reproduction of the Original on a reduced scale.

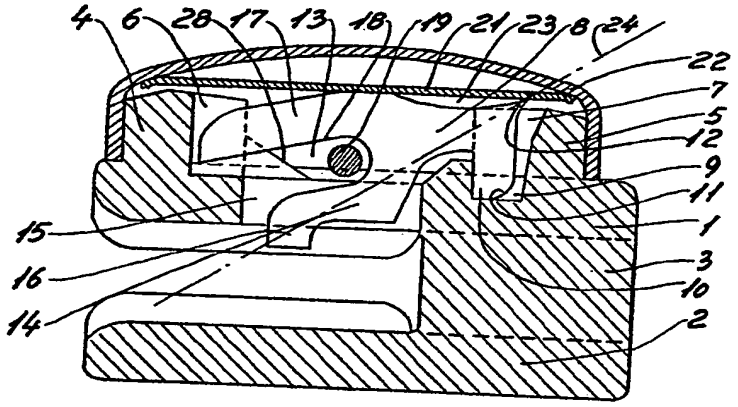

Fig. 1

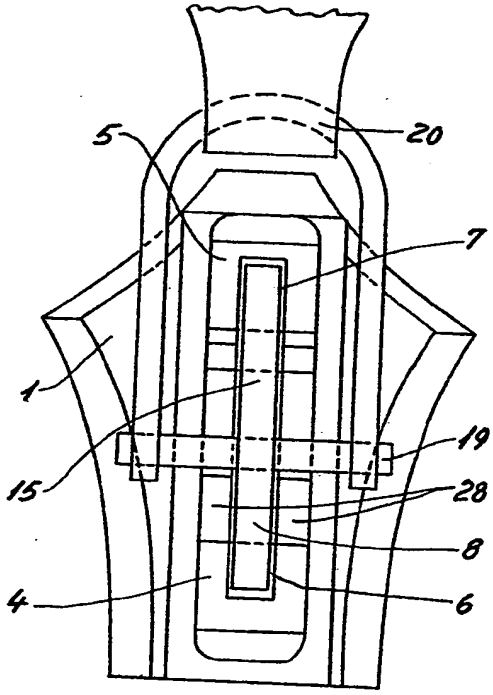

Fig. 2